

Scientific Conference on Chemical and Biological Defense Research

**ZEPTOMOLE TO FEMTOMOLE DETECTION OF ISOTOPE-LABELED
COMPOUNDS IN CHEMICAL DEFENSE RESEARCH**

John Vogel, Bruce Buchholz, Norma Pawley, Robert Mauthe, and Karen Dingley
Lawrence Livermore National Laboratory
Livermore, CA
(510) 423-4232, (510) 423-7884 (FAX)
vogel2@llnl.gov

Accelerator MS (AMS) detects long-lived isotopic labels (e.g. carbon-14: half-life = 5700 years, or iodine-129: half-life = 16 Myr) at zeptomole to femtomole sensitivities in mg-sized samples. The technology is applied to *in-vivo* studies of carcinogen or nutrient distribution, metabolism, and molecular interactions. We applied this method in a preliminary measure of chemical synergy at scaled human-equivalent exposures by dosing rats with ¹⁴C-labeled permethrin (5μ/kg) after 10 days of chronic dosing (in feed) with pyridostigmine bromide (2mg/kg/day). The possible synergy of these compounds has been suggested in connection with "Gulf War Syndrome." The application of this analytical tool for determining ADME parameters, bioavailability, molecular consequences, efficiency of protective devices or actions, and calibration of field assays in described, along with an explanation of the basic technique.

Work was performed under the auspices of the U.S. Department of Energy at Lawrence Livermore National Laboratory under contract W-7405-ENG-48.

Session:

1. Toxicology
2. Detection
3. Protection

Either presentation mode.